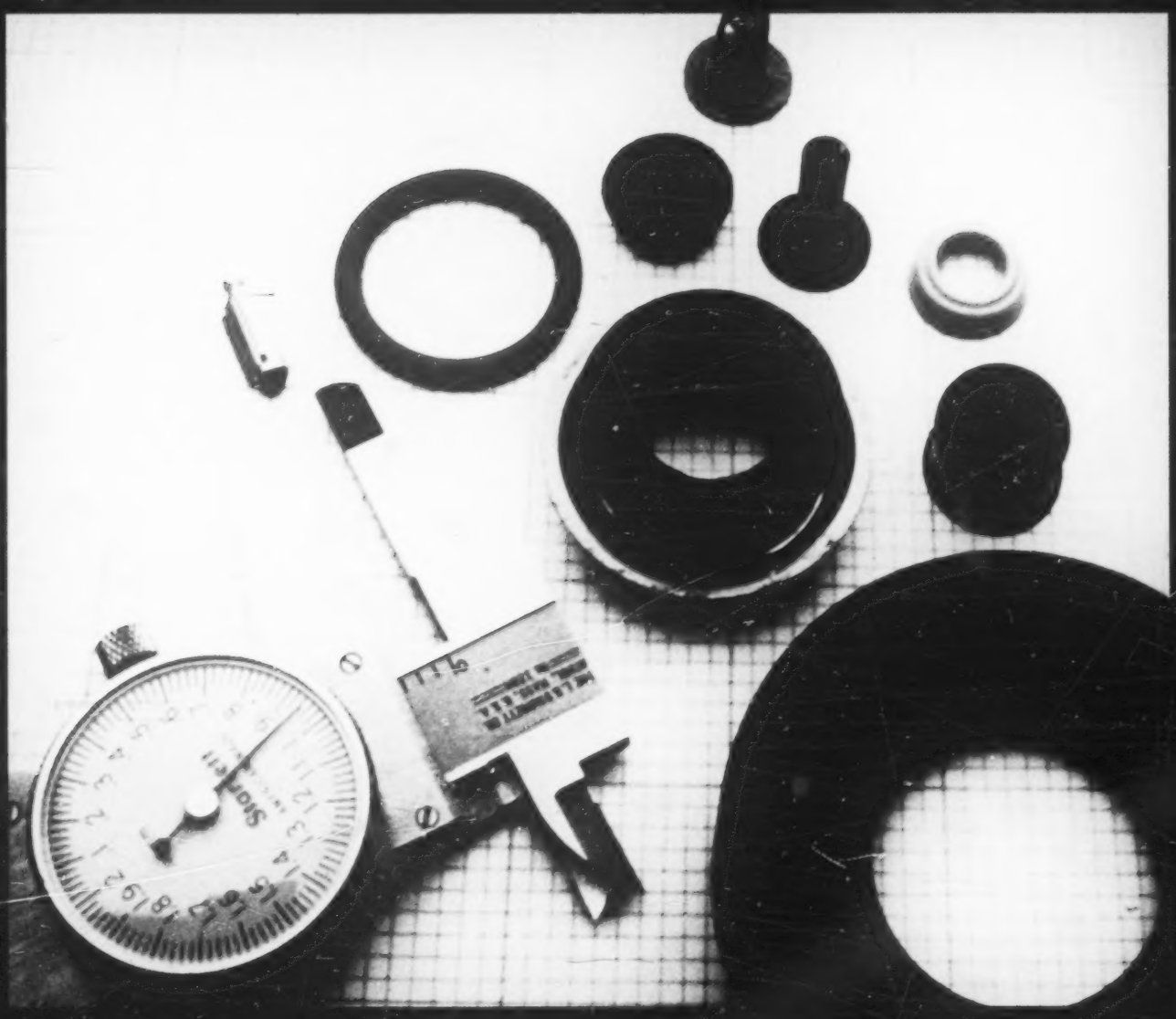
The technical service magazine for the rubber industry

Volume 198. No 1. April 1988



Management tools for a quality process

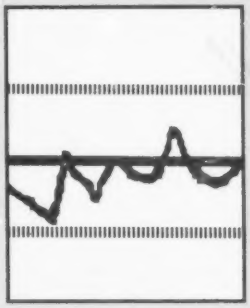
Statistical approach to improving testing and quality

Design of experiments

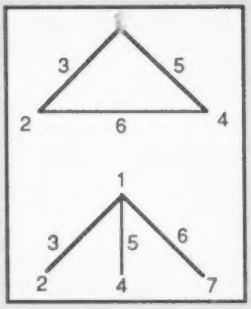
Contents

Vol. 198, No. 1/April 1988

Volume 198, No. 1



Improving testing & quality p.18



Design of experiments p. 26

6 Business Briefs
Acquisitions, expansions; contracts, licenses; financial statements; markets, news.

14 Tech Service: Quality systems - an outside look
by Jon Menough, contribtuing technical services editor. Development of laboratory manuals is of critical importance to developing a comprehensive quality program and to obtaining laboratory accreditation.

16 Urethane Forum
This month's column provides an overview of the Polyurethane Manufacturers Association's meeting to be held April 23-27 in San Diego, CA. The Structural Foam Division of the Society of the Plastics Industry, Inc.'s next meeting, to be held April 10-13 in Philadelphia, PA, is also reviewed.

18 A statistical approach to improving the testing and quality of synthetic rubber
by Colette M. Korosec, Polysar Ltd . The author describes a systematic way to improve the quality of the process of manufacturing synthetic rubber. She emphasizes the need to identify early the major contributors to variability and minimize their contributions.

26 Design of experiments in the rubber industry
by Oscar A. Ruiz, Copolymer Rubber & Chemical. This article shows how carefully designed experiments in the stage of lab evaluations can succeed in substantially increasing the product quality in production.

38 Management tools for guiding and measuring a quality process
by D.J. Adams, BFGoodrich. The author enthusiastically describes a way to lead an organization in implementing the four basic steps: See the goal; Sell the need; Set the plan; Solicit the feedback.

42 Patent News
edited by Bob Samples, Akron Rubber Development

55 Techno Mart

Departments

4	Editorial	53	Calendar	66	Literature
46	Meetings	65	Jobs & People	68	Ad Index

Cover

Cover photo courtesty of 3M Company.

A Lippincott & Peto Publication

Editorial

The following is a letter sent by Rubber Manufacturers Association president Donald Brotzman to Ambassador Clayton Yeutter, U.S. Trade Representative, concerning the possibility of the U.S. not ratifying the International Natural Rubber Agreement:

"Dear Ambassador Yeutter:

We are concerned that the administration may not seek funds for the new International Natural Rubber Agreement.

Industry officials have served on U.S. delegations and as advisors on INRA policy for many years. In the view of the board of directors of the Rubber Manufacturers Association, U.S. withdrawal from INRA, and the resulting liquidation of the large buffer stock, would be inconsistent with U.S. interests for the following reasons:

1. Commercial relations with other INRA member countries would be strained. The U.S. would be seen as reneging on negotiated commitments. Other countries could question our credibility, particularly since the administration achieved virtually all of its objectives in the negotiations, signed the new treaty, and sent it to the Senate for ratification. Our members supported these efforts and have publicly stated that the new agreement should be established quickly to avoid the adverse consequences of liquidating the buffer stock.

2. Forced liquidation of the buffer stock would disrupt markets, increase price volatility, and impair the efforts of our Far Eastern suppliers to implement sound investment policies. It is in the long term interest of the U.S.A. to have stable supplies and this requires consistent U.S. policy towards INRA.

3. The U.S. treasury could lose money if the INRA is liquidated. At present, the agreement is selling stock gradually at relatively high prices. If all buffer stocks have to be liquidated in a short period, the market would bid prices lower for INRA stocks and revenues would decline. This would be considered in relation to U.S. budgetary constraints.

The rubber industry hopes that this administration can find a way for the United States to continue to participate in the International Natural Rubber Organization."

Brotzman's letter is in response to reports that INRA funding may fall victim to cuts in the budget proposed by the administration. It would be understandable if the agreement was unworkable, as many claimed it would be when implemented in 1980. But that hasn't been the case. The buying and selling of rubber stocks according to world market prices, the major mechanism of the agreement, has worked. When prices fell sharply during the first half of this decade, the buffer stock manager purchased for the stockpile to keep prices up, and now with higher prices being posted, the manager is selling from the stockpile. As a result, producing countries have kept producing, instead of switching to more lucrative crops, and the consuming countries have had a steady supply of natural rubber at somewhat stabilized prices.

Being the largest consumer of natural rubber, it is more than in the best interest of the U.S. to ratify this agreement. We urge the administration to quit playing games and continue the process of ratification.

Don R. Smith
Editor

RubberWorld

EDITORIAL STAFF

Don R. Smith editor
Dr. Walter C. Warner technical editor
Jill Wrigley managing editor
Julie Wagner associate editor
Joan Colbert composition editor
Jon Menough contributing technical service editor

BUSINESS STAFF

Job Lippincott publisher
John W. Peto v.p. sales
Regina Hill adv. production manager
Jane McBee assistant adv. production manager

EDITORIAL OFFICES

P.O. Box 5485
1867 W. Market Street
Akron, Ohio 44313
(216) 864-2122
Telex: 297690 RWMAG UR

OTHER LIPPINCOTT & PETO PUBLICATIONS

- Product News
- Automotive Polymers & Design
- Blue Book: Materials, Compounding Ingredients, and Machinery for Rubber

RUBBER WORLD, ISSN-0035-9572, April 1988 Vol. 198, No. 1 Copyright: Lippincott & Peto, Inc. 1988; all rights reserved. J.H. Lippincott, John W. Peto, owners. Published monthly at 1867 West Market St., Akron, OH 44313 by Lippincott & Peto, Inc. Editorial and Executive Offices at 1867 West Market St., Akron, OH 44313. Second-Class postage paid at Akron, OH and at additional mailing offices. Postmaster: please send changes of address to RUBBER WORLD, Circulation Dept., P.O. Box 302, CromPond, NY 10517. Subscription Rates: U.S.—1 year $27; Canada, $32; Foreign, $43 in U.S. currency by U.S. bank draft or international money order. Single Copies $3.00. April 1988.

All rights reserved.

Business Briefs

Acquisitions, expansions

Bridgestone, appears to be the winner in the bidding for **Firestone**, the fifth largest tiremaker in the world. Bridgestone initially was to obtain 75% of Firestone's tire operations when the two companies went public with their negotiations. Italian tiremaker **Pirelli** offered to buy all of Firestone for $58 a share, scuttling Bridgestone's deal. The Japanese company countered with an $80 per share offer for the whole company and the offer was accepted by Firestone's board of directors. When the deal is completed, Bridgestone will become the third largest tire manufacturer in the world behind Goodyear and Michelin.

Polysar, through debottlenecking steps, is increasing ethylene-propylene rubber capacity to 35,000 metric tons annually at its Orange, TX plant. Work is expected to be completed in the first quarter of 1989. The company also announced it will bring on stream facilities at Orange to produce two new types of polybutadiene rubber. The new polybutadienes will be manufactured using a lithium catalyst. One will be a medium-vinyl BR rubber designed primarily for use in tire tread compositions and the other is an impact modifier for polystyrene plastics. When modification work is completed late this year, the plant will have an initial capacity of 25,000 metric tons.

Dow Chemical is moving its Automotive Materials Group to expanded facilities in Southfield, MI. The Dow Automotive Center will serve as the U.S. focal point for the company's worldwide marketing, technical and applications developments resources when it opens in mid-1988.

Huls America is consolidating the chemical and plastics business of **Nuodex Inc.** and the **Dynamit Nobel America** group of companies. Huls acquired Nuodex in 1985 and DNA in 1987.

Arco Chemical restarted its styrene unit at Monaca, PA, and increased capacity at its Channelview, TX complex. The Monaca facility has a capacity of 210 million pounds per year. The Channelview expansion will increase capacity to 1.3 billion pounds per year. The company also completed an expansion of ethylbenzene production at Channelview, increasing capacity to 1.7 billion pounds per year.

Wacker-Chemie GmbH, Munich, acquired another 47% of its Italian sales and marketing subsidiary from its former partner **B.H. Schilling**. Wacker-Chemie now holds 97% of the shares.

The **UCB Group** of Belgium now controls 100% of **Quimica Iberica SA**, Madrid, Spain, a manufacturer of acrylic resins, resins for radiation curing and polyurethane resins.

RMA tire report through December
(figures in thousands of units)

Passenger tires	YTD '87	YTD '86	% change
Shipments			
original equipment	52,913	54,392	-2.72
radial	44,989	45,778	-1.72
replacement	151,892	144,267	+5.29
radial	137,048	125,102	+9.55
export	5,987	4,032	+48.49
radial	5,215	3,098	+68.33
total	210,792	202,691	+4.00
radial	187,252	173,978	+7.63
Production	167,522	159,350	+5.13
radial	147,825	135,444	+9.14
Truck & bus tires			
Shipments			
original equipment	7,845	6,859	+14.38
radial	5,495	4,631	+18.66
replacement	34,514	32,392	+6.55
radial	19,000	15,732	+20.77
export	2,069	1,302	+58.91
radial	1,483	773	+91.85
total	44,428	40,553	+9.56
radial	25,978	21,136	+22.91
Production	35,456	30,939	+14.60
radial	20,176	15,476	+30.37

Gayson
Silicone Pigment Dispersions

♦ customized systems
♦ specializing in FDA color selection

Silcopas
Pigments in silicone fluids in paste form.

Silcogum
High pigment concentrations as firm masterbatch

Gayson, inc.
PO Box 222
Ringwood, New Jersey 07456
(201) 728-8100

Circle 5 on card

Business Briefs

Degussa Group reported 1987 profit of 230 million DM on a turnover of 11.7 billion DM.

Essex Chemical reported a net loss for 1987 of $16.6 million with sales of $191.5 million.

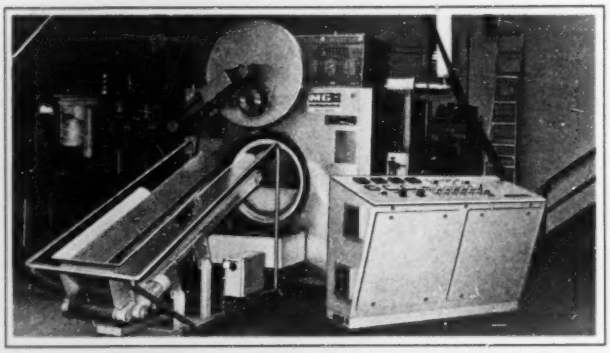
GenCorp reported first quarter net income of $17 million on sales of $468 million.

Lydall, Inc. had 1987 earnings of $4.7 million on sales of $134 million.

RMA rubber report through December (figures expressed in metric tons)

	1987	1986	% change
Total new rubber			
New rubber available	3,275,528	3,037,419	7.84
Imports	1,093,411	1,024,645	6.71
Exports	491,005	391,891	25.29
Apparent consumption	2,793,281	2,638,793	5.85
Total natural rubber			
Imports	810,824	769,345	5.39
Exports	36,996	36,473	1.43
Apparent consumption	775,824	743,563	4.34
% total new rubber	27.77	28.17	
Total synthetic rubber			
Production	2,182,117	2,012,774	8.41
Imports	282,587	255,300	10.69
Exports	454,009	355,418	27.74
Apparent consumption	2,017,456	1,895,229	6.45
	72.22	71.82	
Total SBR			
Production	850,365	791,501	7.44
Imports	83,277	95,843	-13.11
Exports	172,114	111,713	54.07
Apparent consumption	770,813	771,190	-.05
Total nitrile			
Production	68,541	59,309	15.57
Imports	16,175	12,311	31.39
Exports	13,369	11,915	12.20
Apparent consumption	68,060	61,501	10.66
Polybutadiene			
Production	371,349	336,364	10.40
Imports	81,964	60,417	35.66
Exports	60,816	23,708	156.52
Apparent consumption	394,449	366,814	7.53
Ethylene-propylene			
Production	254,062	229,629	10.64
Imports	7,138	4,460	60.04
Exports	47,228	45,107	4.70
Apparent consumption	208,885	186,463	12.02
Butyl, polychloroprene, polyisoprene, silicone and other synthetic elastomers			
Production	637,801	595,971	7.02
Imports	94,033	82,269	14.30
Exports	160,482	162,975	-1.53
Apparent consumption	575,251	509,261	12.96

Reduce Your Nitrogen Consumption for Deflashing by 50%



We have the equipment: The CRYOJET® Rotor, built and backed by MG Industries, a worldwide supplier of industrial gases and gas technology

The CRYOJET Rotor is the most versatile and economical deflashing system available anywhere.* It has high operating efficiency for both large and small batches of all types of rubber and consolidates coarse and fine deflashing in one operation.

One CRYOJET Rotor can generally replace two belt or tumble machines in throughput and efficiency.

The CRYOJET Rotor:

- Utilizes both steel and plastic shot with easy changeover
- Operates with small shot quantities in circulation inside the unit (80 lbs steel shot or 40 lbs plastic shot)
- Has shot separation taking place in a cold dry environment which eliminates separator plugging up and assures good separation of shot and flash
- Deflashes small parts down to ¼" with standard drum and even smaller with optional drum insert without losing parts and without having to use a basket
- Has a very low liquid nitrogen consumption. Average 0.5 lbs LN_2/lb product with normal rubber parts
- Has a compact and rugged construction, built to handle years of steel shot use

** Recent consumption comparisons reveal reductions of 50% or more with throughput increases of over 100%. For a copy of the Results Report, please contact MG Industries' Applied Technology Group.*

® CRYOJET is a registered trademark

MG Industries, 2460 Boulevard of the Generals, Valley Forge, PA 19482. (215) 630-5614.

MG Industries™
Gas Products

Circle 8 on card